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GUIDELINES FOR THE FOLLOWING PROJECTS WERE PREPARED BY MEMBERS OF THE EDUCATIONAL MEDIA COUNCIL--(1) ASSESSMENT OF THE UNIQUE EDUCATIONAL POTENTIALS OF VARIOUS MEDIA, (2) TEACHER AND SPECIALIST PREPARATION FOR USE OF EDUCATIONAL MEDIA, (3) AN INFORMATION-DISSEMINATION PROGRAM, (4) DEVELOPMENT OF BIBLIOGRAPHIC CONTROL OF EDUCATIONAL MEDIA, AND (5) DEVELOPMENT OF RECOMMENDED TECHNICAL SPECIFICATIONS FOR EDUCATIONAL MEDIA. MEDIA ASSESSMENT THEORETICALLY CAN BE AIDED BY DEVELOPMENT OF A MEDIA RESEARCH PROGRAM WHOSE GOAL IS PREDICTION AND CONTROL OF LEARNING EVENTS. AMONG DIFFICULTIES IN CURRENT RESEARCH ARE THE "SYNERGISTIC" EFFECT OF MEDIA IN COMBINATION, AND RECURRENT FINDINGS OF "NO SIGNIFICANT DIFFERENCES" AMONG LEARNING EFFECTIVENESS OF MEDIA. TO OBTAIN SIGNIFICANT DIFFERENCES, IT IS SUGGESTED THAT RESEARCH MUST BECOME MORE SOPHISTICATED IN THEORY, DESIGN, AND INSTRUMENTATION. (LH)

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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EDUCATIONAL MEDIA IN TRANSITION

GUIDELINES FOR:

- Assessment of the Unique Educational Potentials of the Various Media
- Teacher and Specialist Preparation for Use of Educational Media
- An Information-Dissemination Program
- Development of Adequate Bibliographic Control of Educational Media
- Development of Recommended Technical Specifications for Educational Media

A Report

To the United States Office of Education,
Department of Health, Education, and Welfare,
pursuant to Contract #OE2-16-004

EDUCATIONAL MEDIA COUNCIL

250 West 57th Street
New York, New York 10019

October, 1963

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PREFACE

These guidelines were prepared by committees and were regularly subjected to the scrutiny and review of the Educational Media Council as a whole. These guidelines reflect the combined judgment of the Council membership, though all organization members of the Council and all individual representatives do not necessarily agree on all details of the guidelines. Every Council member was active on one or more of the "Guidelines" committees. The committee chairmen were:

Assessment of the Unique Educational Potentials of the Various Media

James D. Finn

Teacher and Specialist Preparation for Use of Educational Media

Lee W. Cochran

An Information-Dissemination Program

John J. Dostal, Chairman (September '61 - October '62)
Thomas R. Robinson, Chairman (October '62 - February '63)
Robert E. de Kieffer, Co-Chairman

Development of Adequate Bibliographic Control of Educational Media

Carolyn I. Whitenack

Development of Recommended Technical Specifications for Educational Media

Ben Edelman

Because of the rapid developments in the educational media fields, requirements are necessarily changing. Consequently, the guidelines

recommended in this report may need updating from time to time. For the present, they should serve as a useful frame of reference until major breakthroughs have been made in the above areas of needed investigation.

Respectfully submitted,

Charles F. Schuller, Chairman

October 7th, 1963

INTRODUCTION

The dominant notes in education today are those of "development" and "change." As better understanding of the learning process and more critical scrutiny of educational objectives point the way to improved achievement -- methods, materials, and facilities are being modified or replaced, and new ideas are being tested and adopted on a scale never before seen in American education.

Primary factors in this developing revolution in education are the rapid changes taking place in our own culture and in other cultures. In consequence, unprecedented challenges are being placed upon our educational system. It is no longer a matter for serious argument that the education of the last generation is inadequate for today's needs, to say nothing of tomorrow's. Evidence of the growing will to change is found not only in wide applications of ETV, language laboratories, and programed instruction -- important though these are -- but also, and more significantly, in the basic thinking of administrators, curriculum planners, psychologists, and subject-matter specialists. Innovation is becoming the order of the day.

It is in the process of translating new ideas, new content, and new methods into action that the educational media come into sharp focus. They constitute technological means by which educational improvement on the vast scale required becomes possible. But they are also more than that, for the process of technological development is also regenerative. On the one hand, it generates of necessity a better understanding of the learning process through essential research and experimentation. On the other, it stretches the imagination and expands educational horizons by making possible and feasible learning experiences undreamed of in the traditional school.

Thus, developments in educational media, materials, and methods epitomize i a broad sense significant changes taking place in American educational thought and presage greater changes. Following are some of the highlights of development and change to this point:

1. The contributions of psychology to a better understanding of the learning process are giving opportunities to re-examine older theories and explore new concepts involving levels of learning, concept formation, and individual learning patterns in self-instruction.

2. The adaptation of mass-communication devices such as film, radio, TV, and paperback books has resulted in increased teaching effectiveness with greatly enlarged numbers of students -- and a reconstruction and elevation of the role of the teacher.

3. A commensurate emphasis on scientifically controlled self-instruction is evidenced in learning laboratories for foreign languages, speech and music and in self-instruction devices ranging from programed books to computer-directed programs and individual performance recorders.

4. New methods of recording, storing, selecting, retrieving, and reproducing educational content are evolving from research and development in handling the explosive growth of knowledge in many fields. Discs, tapes, films, wires, drums, etc., are being used to record information electronically, to store it, and to reproduce it instantaneously when needed.

5. Advances in communication science and technology are affording opportunities for new applications in teaching methodology. At the moment, the use of computers seems likely to furnish an opportunity to individualize instruction for substantial numbers of students from a large store of materials, according to control programs designed to adjust lesson material to the individual student's performance and capabilities.

In order that education may capitalize efficiently and intelligently on such media developments as the above, certain parallel research and development is fundamental; a more clear-cut understanding of the unique characteristics of the various media is required; more and better trained media specialists are needed; the results of experimentation and research must be disseminated more rapidly and more widely; and the continuing and rapid development of materials and devices necessitates the development of both bibliographic control and more standard technical specifications adapted to educational needs.

The Educational Media Council submits the following statements for consideration by the U.S. Office of Education as an aid in deciding the direction for research and development activities in the field of educational media. The statements should be thought of as guidelines rather than as detailed prescriptions. Progress is so rapid in the educational media field at the present time that the guidelines suggested in these statements should be reviewed carefully within twelve to eighteen months to determine whether or not a change of direction, of emphasis, or of an entire program is needed. These guidelines have been prepared for their immediate and continuing value in obtaining maximum improvement in education.

Guidelines for Assessment of the Unique Educational Potentials of the Various Media

Statement of the Problem

The problem faced when considering a strategy for assessing the unique potentials of the various media now available for use in instruction is essentially a problem lying somewhere on the continuum where pure science shades into applied science. Pure science aims at understanding; applied science aims at prediction and control. It is obvious that prediction and control cannot ideally be achieved without full understanding. In practice, however, as in many phases of engineering and medicine, action must proceed for human benefit and control and is attempted on a mixed basis of scientific knowledge, experience, trial and error, and folklore.

In general, improvement in any process are related to the change in the mix in the direction of greater understanding and the consequent sharpening of prediction and control techniques. Thus, the scientific and rigorous experimental components become greater; and the trial-and-error, art, and folklore elements become smaller. The attempt, in all education, is to move in this direction, and it is in this context that the problem of media use must be assessed.

In considering what is known about the capabilities and use of the several media in instruction, the twin factors of understanding and prediction and control come into sharper focus. Ideally, as in any particular instructional situation, given clear objectives, an adequate description of the particular learners to whom the instruction is to be directed, and a

carefully defined subject matter or skill to be taught and/or learned, it should be possible to select with precision the media to be used, the facilities to be provided, and the duration and form of learning activities, etc., to accomplish the stated objectives. Such an ideal situation would require complete understanding (among a series of related factors) of the unique capabilities of the several media and an ability to predict their effects and hence control their use in any given instructional situation.

Unfortunately, this ideal situation is not yet attainable. It should be pointed out that only part of the difficulty relates to media knowledge *per se*. Other very important (and related) aspects, such as the lack of a true theory of learning and/or communication, contribute heavily to the fact that we cannot predict and control instructional events with any high precision.

The problem, in fact, of assessing the unique potential of the several media, viewed in the largest possible dimension, would require a complete knowledge of both human behavior and human art. Viewed in a smaller, and superficially more measurable, dimension, the theoretical solution to the problem of assessment would consist of (1) an analysis of existing research to determine what is now known concerning the unique potential of each of the several media, and (2) the development of a research program to fill in the gaps which have been discovered. The knowledge thus accumulated should permit the desired prediction and control. Unfortunately, such a procedure is not that simple, and is beset with difficulties of a severe order.

Some Difficulties Surrounding the Theoretical Solution

A list of difficulties surrounding an attempt to apply the simple

theoretical solution stated in the paragraph above could be long indeed, however, and a sample will be stated in this section. It should always be kept in mind, moreover, that media research must be viewed as a salient within a larger attack on the unknowns of human behavior, such as the study of the parameters of learning and communication. Further, all of these processes occur within a social enterprise known as "education," which has an economics, a sociology, and many other related elements, and which includes real people operating in real time and in a real environment.

For purposes of this paper, the difficulties mentioned will be confined to media and media-related problems. They have been derived from a study of the research, observation of field problems, and the body of experience with media accumulated over the last four decades. The difficulties include: (1) the problem of synergistic effect; (2) the problem of "no significant difference"; (3) the problem of the ratio of environmental and biological factors to experimental variables; (4) the problem of perception; (5) the problem of context or ecology of learning; (6) the problem of economics; and (7) the problem of the communicable nature of knowledge.

1. Synergistic Effect

Many of the media to be studied present information in the form of written words, pictures in black and white and color, and sounds including spoken language, natural sounds, and music. Some media utilize only two of these elements; others use several in combination and add other dimensions, such as motion. In addition, one medium need not be used alone; several are often combined.

Since the work of Rulon (1933), there has been a strain in the research which suggests that media in combination are superior in effect to one medium alone. Hoban (1960) refers to this as a "synergistic effect." The existence of a synergistic effect (even though Hoban assigns this concept a "low-certainty" rating) will make the assessment of the "unique" potential of a given medium extremely difficult. An analogy could be found in chemistry in the differences between sodium as a metal and sodium chloride as a salt.

2. <u>"No Significant Difference"</u>

In intermedia research, particularly in the last decade, the finding of no significant difference (used in the statistical sense) crops up again and again in comparisons, for example, between television teaching and classroom lectures or between a programed text and a simple write-in teaching machine. Such findings put a large roadblock in the way of a move toward determining the unique potential of each medium of instruction.

This paper is not the place for an elaboration of the discussion of possible causes of this phenomenon which takes place among research workers in the media field. The possible reasons are many -- testing instruments that are not sharply enough defined to detect differences; inadequate use of the medium for what it can do; uncontrolled (and undetected) variables; the presence of the Hawthorne effect; etc.

The "no significant difference" findings -- and not all findings are of this category by any means -- do mean that the research effort must become more sophisticated. It must become more sophisticated in guiding theory, in design, in instrumentation, in methodology, before the objective of the assessment of "unique potential" may be achieved.

3. The Ratio of Biological and Environmental Factors to Experimental Variables

The difficulties of all media research have been pointed up a number of times by C. R. Carpenter when he has expressed (in private conversation) his concept of the unfavorable ratio of biological and environmental factors to experimentable variables. This concept can be illustrated hypothetically by assuming that an individual or a group of individuals to be taught in an experiment using media comes to the experiment almost totally "programed" in advance in a manner which can be expressed as percentage weights. That is, they are, for example, fifty per cent the product of their biological structure and forty per cent the product of their total environment up to that point in time. This leaves the media experimenter only ten per cent which he can vary and attempt to control. He must, however, measure the whole one hundred per cent. The ratio weighs too heavily against him, partly because his instruments are not sensitive enough, and his results can be unreliable.

4. Perception

There is almost a whole school of psychology based on the experimental observation that both individual and social factors (probably in combination) influence the reception of messages by people. Reverse or "boomerang" effects of mass media messages have been noted (Fearing, 1954). The work of Ames and others (Kilpatrick, 1961) demonstrated that individuals see what they have been "programed" to see, notwithstanding the fact that they have been informed otherwise.

In other words, perception which may be a social, physical, and individual psychological phenomenon -- influences the persuasive or informational character of the messages received from any medium. This general fact interposes a filter between the medium and the individual receiver and makes increasingly difficult the assessment of the potential of the medium itself.

5. The Context or Ecology of Learning

If the human organism is considered a part of the context or field which he occupies, he can never be separated from that context for purposes of learning and instruction (except, perhaps, occasionally in a laboratory). The studies of a few years ago on the influence of social class on learning showed examples of this phenomenon. It is very difficult, therefore, to assess in any given experiment, the exact contribution made by the medium used when it is considered in a context or field of learning involving the learner and his history, his membership in social groups, the role of the teacher in the process, general factors of the environment, etc. This is not an impossible difficulty to overcome, but it requires new and more precise instruments and techniques.

6. Economics and Efficiency

As was indicated earlier, media use in education takes place in a real situation. This immediately raises the question, when considering the unique potentials of the several media, unique for what? Only in a

situation with no limits can uniqueness be considered in the abstract, divorced from all real considerations. As such, its determination could be considered a scientific question.

In reality, the determination must always have elements of application -- of engineering and economics. Given two situations using two different media, what has been the investment in time, energy,and money in each when set against measured output which is, in turn, carefully compared with ideal output as indicated by precisely stated objectives? Thus, in a different sense, a new form of uniqueness must be assessed -- a uniqueness related to feasibility.

Feasibility, itself, in this context is a broad concept and related to the ecology or context of learning. The nature and status of equipment, the nature of the materials, the flexibility of the environment - all must enter into any determination of positive economic advantage. And positive economic advantage must be considered as a part of the uniqueness syndrome.

7. The Communicable Nature of Knowledge or Persuasion

It should be obvious that, since media carry messages, the messages, too, must be considered in any attempt to assess media potential. When thinking is concentrated on media, it is easy to forget that not all content is the same, nor are treatments within media, even of the same content, the same. Obviously, unless this vital element is held constant, any assessment of media per se would be suspect.

There are two general problems here. They are: (1) the structure of subject matter, and (2) the nature of treatment. It is now very popular, due to the rediscovery by Bruner (1956) that subject matter has structure, to talk as if all subject matter did, in fact, have a communicable structure. While this is true to a large extent in the physical sciences and to a slightly lesser extent in the life sciences, it is patently not true in the social sciences, humanities, and the applied fields in the same sense as the term, "structure," is used to refer to the paradigms of the physical sciences. Kuhn (1962) states that, "it remains an open question what parts of social science have yet acquired such paradigms at all. History suggests that the road to a fine research consensus is extraordinarily arduous."

In Bruner's terms, if the structure of knowledge can be built into messages, it can be communicated as structure, and, hence, learned. This should have some relation to the effectiveness of the media used. However, where structure is incomplete or non-existent (and this is probably true in more cases than not), the whole problem of the communicability of knowledge is raised once again. It becomes difficult to separate this variable in knowledge structure from the media variables.

Subject matter not only is related to structure, but it is also treated in some way by the creator of the message, which in turn is transmitted via the medium. A film, for example, is not just a film. It may be a record, a documentary comment, a didactic presentation, an artistic experience, a breathtaking drama -- or parts of some or all of these.

Within these general treatments lie an entire grammar and rhetoric involving montage, editing techniques, camera artistry, etc. This immediately implies that the particular medium must be very closely defined in order to determine its "unique potential."

Further, if the paragraph above is thought of as treating the artistic or creative aspects of message design, another treatment -- further complicating the process -- needs discussion. In its present aspects, such treatment is symbolized by programed instruction. Here, the treatment of the subject matter is guided entirely by psychological considerations. Most programing follows the theories of operant conditioning; some programing follows other theories or uses combinations of theories. The point, however, is that the treatment is not then so much creative or scientific (experienced programers have, however, identified creative aspects to programing). Lumsdaine (1963) extends these scientific concepts to provisions for response, student participation, etc., in relation to all media. If the scientific aspect of message creation is involved, the complications of the problem of determining the unique potential of the medium are further compounded because measurements may report on the technique of message creation, not the medium per se. It does not remove the problem, however. The depth of the question is merely changed. It now becomes which medium is most useful for the particular type of scientific programing used.

As was indicated at the beginning of this section, the difficulties discussed above are illustrative,not a complete catalog. The difficulties are not stated to discourage attacks on the problem of assessing media potential, but to caution against naiveté and too narrow an approach.

There is, for example, a certain naiveté abroad in some circles related to, but not necessarily part of, education which assumes that the potential of the media can be assessed from existing research or quickly ascertained and that a systems approach to instruction can immediately be designed. Further, it should be emphasized that the difficulties enumerated or implied also mitigate against the development of a set of guidelines which can become anything like a prescription for the research and development activities of the U.S. Office of Education in the media field.

The remaining sections of this paper will, however, suggest some general guidelines for research and development policy within the U.S. Office of Education in attempting to assess the unique potential of the media in instruction. Such research and development activities are desperately needed. As was indicated in the introduction, these general guidelines should be subject to regular review and change when necessary.

Utilization of Current Efforts

Fortunately, in the formulation of media research and development policy, the U.S. Office of Education does not have to start from scratch. There are, of course,older summaries and analyses of research that may be drawn upon. These include Hoban and Van Ormer (1950) (films); May and Lumsdaine (1958) (films); Kumata (1956) (TV); Schramm (1962) (TV); Schramm (1963) (teaching machines and programed learning); Allen (1956), Allen (1960), (audiovisual materials in general), and Finn and Allen (1962) (educational technology). There are,in addition, summaries and analyses of related communication research, such as Hovland, et al. (1949) and Schramm (1954).

It is recommended that the U.S. Office of Education continue, deliberately and regularly, to monitor existing studies of research in order to give adequate direction to research policy. (1)

The foregoing list of summaries and analyses does not include current work, most of which is sponsored by the U.S. Office of Education. Reference is made here to the work of Travers and his colleagues at the University of Utah, which shows much promise in developing a structure and research policy in the field; to the work of Lumsdaine at the University of California at Los Angeles, some of which has been published in an early form (Lumsdaine, 1963); to the work of Allen and Stanley, which has been done "in house" for the U.S. Office of Education; and to the recent symposium of research scientists in the field of programed instruction held by the National Education Association and now in the process of publication.

All of this work will have bearing on the problems of research policy in the media field.

It is recommended that the U.S. Office of Education (1) on a planned basis, keep in close touch with these and other workers for suggestions bearing on research policy, and (2) through grants and contracts, continue and expand work in the analysis of research and related matters. (2)

The Development of a General Strategy

Due to the complexities of the problem of assessing media potential, a broad general strategy (or strategies) is necessary for an attack on the problem. The concept of strategy, in this context, assumes a broad approach, but with salients selected for special attention as needed. Such

a strategy would be based on an inclusive concept of research design and method and not limited to one or more narrow approaches.

Strategy development should include, but not be limited to, the following:

1. Recognition of the Research Continuum

It is known that, from grids developed by Allen and others, media research has been viewed in the Office from several points of view including level of education, subject matter transmitted, medium used, etc. The introductory discussion indicated, through the difficulties cited, that the problem of assessing the unique potential of the media involves basic as well as other forms of research.

It would be well, in developing policy, for the Educational Media Branch to think of research in the media field as existing on a continuum. The old dichotomy of pure and applied science is neither useful nor exact. Various attempts have been made to describe research continuums which range from pure science to day-by-day application. It is helpful to think of media research in this way, and the following is suggested:

Basic Media Research. An example of this would be the recently completed study by Allen and Cooney (1963) on multiple imaging in films.

Applied Research. There are a vast number of studies possible here. Much educational research is more or less applied, as is such psychological research as deals with students and learning in classrooms. Needed here, for example, are studies of input and output ratios with reference to the several media.

Field Research. Some authorities refer to field research only as it is used to answer specific problems for a specific sponsor, as when a school system field-tests programed textbooks in mathematics in order to determine whether or not to adopt such a system. However, in the view expressed here, field research would involve a broader concept. Included would be field studies of media with large numbers of students in many systems; studies of such questions as information reduction and their effect, if any, in the field situation (converting bulletin boards to slides and not using bulletin boards is an example of information reduction); studies of physical, economic, organizational and logistical factors in the field situation.

Development. The term is used here to encompass innovation both in the sense that Brickell (1962) uses the term in reference to education and also as the term is commonly used in defense contracting for the develoment of prototype systems and the like.

Using the paradigm above or any similar paradigm which recognizes a research continuum in the media field, it is recommended that the U.S. Office of Education develop strategy which covers the entire front of such a continuum, extending efforts where analysis show them to be needed. (3)

2. Studies in Methodology

Recently media research, with research in programed instruction leading the way, has concentrated on research designs which are modeled after

research in the physical and agricultural sciences. Efforts are being made by the U.S. Office of Education to disseminate to workers in the field the latest thinking in such designs to aid in setting up media experiments. This work should be encouraged and continued.

However, it is felt such an approach may be too confining to surmount the known difficulties in assessing the unique potential of the several media. C. Wright Mills (1963) has criticized sociological research on much the same ground and has suggested that new methodologies, unique to the problems and content of social science research, should be developed. There is some precedent for this in the media field, notably in the work of Hoban (1962) and in some unpublished work by Beck and Gerbner. Neither of these efforts would meet the criteria with respect to variance, etc., now demanded by the dominant scientists in the programed learning field (laboratory research in this field is another problem); but it is safe to say that each of them is pregnant with insights that would not have been obtainable with experiments designed under the rules first set forth by Fisher. For example, Dale has often suggested that when other means are not available, a technique of "sophisticated observation" is often extremely useful.

There is a policy question underlying this analysis, but there is a prior question of research strategy itself. There is no reason to suppose that physical science models are the last word in research on media even if some of the top scientists in the field continue to insist that this is the case. One way to settle the matter, and to see if the Mills point of view is applicable, is to do research in new methodology.

It is recommended that the U.S. Office of Education encourage and fund research leading to the discovery of new methods of media assessment and the development of greater precision in the old ones. Such work, of necessity, must include a theoretical component. (4)

3. Development of Theory

It is an axiom of present-day science that research ought to be guided by theory as well as test hypotheses. When discussing the development of a research strategy, it is apparent that theory development must be a part of that strategy. Up to the present, only a minor portion of the U.S. Office's support has gone in the direction of theory development. What effort has been mounted, for example, the support given McLuhan, has been fruitful. Some workers in the media field insist that the greatest lack is theory. It is almost certain that no firm answers to the questions surrounding the assessment of the unique potential of the several media can be developed without a better theoretical base than we now have.

It is recommended that the U.S. Office of Education encourage and fund promising efforts in the field of theory development. (5)

Some Immediate Action Possibilities

The above recommendations relate to the general development of a strategy for media research. Strategies are always related to action, and through action, strategies are sometimes developed. In the language of science, empirical work must often precede or accompany more theoretical or abstract work so that the generation of hypotheses may continue and grow. Another way to view the problem is to say that science and technology

interact; that science receives much help from technology in many matters; and that technology, proceeding anyway in order to keep affairs going, can serve an additional useful purpose in feeding its empirical findings back into science. From this position, three specific recommendations are developed.

1. Development of a Computerized Problem-Solving Model for Media Assessment

Computers are being used more and more for various operations research problems, for forecasting, and for stimulation involving trial and error procedures. It would appear that the media research problem is amenable to such an approach.

Over the last forty years, a great deal of media research has accumulated. Buried in many, if not in most, of these studies, is information relating to the unique potential of the several media in instruction. The information accumulated is already too complicated to handle. A very great possibility exists that more information lies within this research than has ever been extracted if the multitude of small pieces could be put together properly.

Such an approach (extracting common elements from a mountain of discrete data) may well be handled by study on a computer.

It is recommended that the U.S. Office of Education (1) fund a feasibility study to determine whether or not computer techniques could be used to extract from existing research useful information concerning the unique potential of the several media, and (2) if the idea proves feasible, fund a project to do it. (6

2. The "Saturation" Study

Since the years immediately following World War II, research and development people in the audio-visual field have talked of a "saturation" experiment or demonstration. The basic idea behind this concept is that, with the exception of certain selected training situations during World War II, no one has ever seen, operated, or explored the results of a situation in which a given unit -- school district, college, etc. was completely saturated with facilities, equipment, materials, and personnel devoted to the application of the new media to instruction.

It is likely that, until such a situation has been set up and tried on a field basis, many of the questions relating to the use of media, including the unique potential of each and their effects in combination, will remain unsettled. It would be ideal to develop the information on a pure research basis or theoretical level ahead of time, and some of this can be done. However, at the present level of knowledge, an empirical approach is needed and can, in turn, feed back information to guide research.

It is recommended that the U.S. Office of Education fund, on an adequate scale, one or more saturation experiments in the use of new media, utilizing the background work that has been developed on this project by several national organizations over the last fifteen years. Care should be taken to properly balance the elements of demonstration, trial and error, and controlled experiment in order to realize the full potential from this project. (7)

3. Empirical Work with Systems

Since one of the basic reasons for assessing the unique potential of the several media is to enable planners eventually to build instructional systems, one possible approach to solving some of the difficulties discussed earlier would be to investigate systems on an empirical basis prior to controlled research and/or theoretical development. Empirically established systems in several fields should yield information concerning the problems of systems design, synergistic effects, etc.

It is recommended that the U.S. Office of Education fund development work in the field of total instructional systems as a necessary base for later controlled experimentation. (8)

4. Annual Symposium

As was indicated earlier, one of the difficulties now present in assessing media research is its sheer volume, wide range of sources, and diversity of publication. These problems are not easy to solve; however, in the physical sciences, some procedures exist which can prove helpful. Specifically, if funding is available, leading research scientists are brought together in symposia and paid well for papers which cover and analyze the research in their various specialties. These papers are then quickly published in book form in order to reach the field.

It is recommended that the U.S. Office fund, through the Educational Media Council, an annual symposium on media research and that this funding include sufficient money so that the Council may publish the results as expeditiously as possible. (9)

BIBLIOGRAPHY

Allen, William H. "Audio-Visual Communication Research," Encyclopedia of Educational Research, ed. C. W. Harris (3rd ed.). New York: MacMillan, 1960.

_____. "Audio-Visual Materials," Review of Educational Research (April, 1956).

Allen, William H., and Stuart M. Cooney. "A Study of the Non-Linearity Variable in Filmic Presentation." Mimeographed. United States Office of Education, Project No. 422, Grant No. 704,081.

Brickell, Henry M. Organizing New York State for Educational Change. Albany: New York State University, 1961.

Bruner, J. S. The Process of Education. Cambridge: Harvard University Press, 1956.

Finn, James D., and William H. Allen (eds.). "Instructional Materials: Educational Media and Technology," Review of Educational Research (April, 1962).

Fearing, Franklin. "Social Impact of the Mass Media of Communication," Mass Media and Education, 53rd Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1954.

Hoban, Charles F. Focus on Learning: Motion Pictures in the School. Washington, D.C.: American Council on Education, 1942.

_____. "The Usable Residue of Educational Film Research," New Teaching Aids for the American Classroom. Washington, D.C.: United States Office of Education, 1960.

Hoban, Charles F., and Edward B. Van Ormer. Instructional Film Research, 1918 - 1950. University Park: Pennsylvania State University, 1951.

Hovland, C. I., I. L. Janis, and H. H. Kelly. Communication and Persuasion: Psychological Studies of Opinion Change. New Haven: Yale University Press, 1953.

Kilpatrick, F. P. "Assumptions and Perception: Three Experiments," Explorations in Transactional Psychology. New York: New York University Press, 1961.

Kuhn, Thomas S. The Structure of Scientific Revolutions. Chicago: University of Chicago Press, 1962.

Kumata, Hideya. An Inventory of Instructional Television Research. Ann Arbor, Mich.: Educational Television and Radio Center, 1956.

Lumsdaine, Arthur A. Chapter in Handbook of Research on Teaching. ed. Nathaniel Lees Gage. Chicago: Rand McNally, 1963.

Lumsdaine, Arthur A., and Robert Glaser. Teaching Machines and Programmed Learning, A Source Book. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, 1960.

Mills, Charles Wright. Power Politics and People: The Collected Essays of C. Wright Mills. New York: Ballantine Books, 1963.

Mulon, Phillip Justin. The Sound Motion Picture in Teaching. Cambridge: Harvard University Press, 1933.

Schramm, Wilbur. "What We Know About Learning from Instructional Television," Educational Television, The Next Ten Years. Stanford, Calif.: Institute for Communications Research, 1962.

_____. Programed Instruction, Today and Tomorrow. New York: Fund for the Advancement of Education, 1962.

_____. The Process and Effects of Mass Communication. Urbana: University of Illinois Press, 1954.

Guidelines for Teacher and Specialist Preparation for Use of Educational Media

New concepts in education involve extensive use of all types of educational media. Team teaching, cross media, programed learning, and educational television are becoming increasingly integral aspects of both formal and informal educational programs at elementary, secondary, college, and adult levels. The expanded use of a wide variety of media has greatly increased the need for leadership and services of educational personnel who by reason of their interest, preparation and experience are qualified to provide the leadership and services required for the effective application of technology to education. To provide sufficient numbers of adequately prepared personnel of this type, it is essential that many additional people be recruited and that programs for their preparation be improved.

Personnel Needs

Personnel are required in these three major categories:

1. Design and Management

The function of the design and management, within teaching-learning situations, of the application of a range of technological devices and materials requires a generalist with a complex background in learning and communication theory, instructional technology, materials, systems theory, management and design concepts, etc. The phrase "a range of technological devices and materials" as used here refers to a distribution ranging from paperback books through

conventional audio-visual devices and television, from electronic learning laboratories and programmed learning devices to computers and complex information storage, retrieval, and display systems.

2. Research and Development

The continuing development of a technology of instruction, of new educational media, has increased the requirement for an accelerated program of research and development in the mediation of learning. This requirement embraces both basic and applied research. Such a program depends upon the availability of research workers which, in the fields under consideration, are in very short supply. Research and development personnel who have an interest in and capability of handling media problems, therefore, represent the second category of educational media specialists.

3. Operational

Within each technical area implied in (1) above, a variety of operational specialists are needed. For example, in the field of educational television, writers, producers, graphic artists, skilled studio teachers, and other specialists are required. Clusters of such specialists, who constitute another essential type of educational media specialist, must be developed to support the operation of new media programs, or, in a more general sense, the new instructional technology.

This categorization of needed personnel included under the general term educational media specialist suggests some of the difficulties inherent in developing programs to prepare such personnel for service. The requirements range from highly technical particulars -- photography or cataloging, for example -- to broadly generalized competencies such as management or logistics. In any program or discussion of the problem care must be taken to specify exactly what personnel are needed and for what purpose.

Program Needs

If new educational media are to help meet the responsibilities of the schools tomorrow, there is an immediate need for a vigorous program of:

1. Professional education of media specialists at all levels, i.e., directors, teachers, and specialists in such areas as graphics, film and TV production, and programming. A new core of research specialists with a particular interest in educational media must also be developed.

2. Re-education of many audio-visual, library, broadcasting, and other media specialists now serving in schools and colleges to broaden and update their professional competencies.

3. Recruitment of new and competent people to enter the educational media field.

Factors Contribution to the Major Problem

1. Colleges and universities cannot be responsible for the entire program or pre-service and in-service training of teachers in the use of educational media because of the vast scope of needs in this area. Studies need to be made -- perhaps on a systems-analysis basis -- to determine the agencies and methods by which the task can best be undertaken.

2. Current pre-service teacher education with respect to the educational media is generally inadequate. It is assumed that the colleges and universities will, if encouraged and assisted, provide necessary improvements in pre-service educational media experiences in teacher education. Needed competencies in educational media, at different levels, should be established and clearly communicated to colleges and universities to assist them in developing adequate programs in this area.

3. Rapid developments in materials and equipment and techniques make necessary a continued retraining program for in-service teachers. This retraining program must be planned so that media specialists now in the public schools and colleges of this country can systematically carry on appropriate retraining courses.
Credit courses are now offered in many of the colleges and universities, and others should be encouraged to establish such courses, to assist in this retraining effort. However, local in-service teacher-

training workshops and conferences relating to the use of new educational media should be staffed by well-prepared educational media specialists within the local school system. It seems probable that higher education resources could best be used in a "train-the-trainer" approach to this problem.

4. There is a lack of organized media demonstration materials that could be used in the school systems and colleges to assist in this retraining problem for the planned use of educational media. It is recommended that a project be instituted to plan, organize, and produce educational media kits for use in the national retraining of teachers to use educational media. Such materials as filmstrips, transparencies, short motion pictures, models, and possibly charts, along with workbooks or manuals, key texts and other reference materials, could be organized into a kit of educational media materials. Such kits would be made available at a state or regional distribution point for use in varied educational media workshops.

5. It is estimated that a large proportion of present media specialists in local school systems are not trained in the broader aspects of educational media and must receive immediate assistance if they are to perform this task of in-service education of teachers for the effective utilization of new media.

Suggested Priority Needs

1. Manpower studies designed to establish current and forthcoming

needs for professional and technical personnel in the media fields. In the course of these investigations, such sources should be used as the NAEB-National Personnel Inventory (Television) and the Alameda State Project to determine:

a. An up-to-date identification of the types of media specialists needed.

b. The competencies required for each type of media specialist.

c. The nature and distribution of needed training and retraining programs.

2. Training and retraining of media specialists in order that those serving in the public schools, colleges, and universities can organize and staff their own workshops for in-service teacher education in the application and effective use of new media.

3. A long-range graduate program at the doctoral level for the education of media directors at both the public school and the college level.

4. A series of masters-level graduate programs to educate specialists in different fields, such as graphic production, film production, program development, television production, etc. This program must be based on a sound educational background, so that the specialists will have some educational philosophy rather than a largely technical viewpoint.

Needed Action

1. Professional preparation of preparation directors of educational media programs.

2. Re-education of present directors of educational media programs to conduct in-service education programs for teachrs.

3. Education of additional media specialists who will be needed in the production of new educational media.

4. Establishing the nature and levels of competencies necesary in different positions, or undertaking studies to make sch recommendations.

5. Recommending studies of ways to organize educational meda kits that could be made available to local school system and colleges.

Guidelines for an Information-Dissemination Program

As a result of changes that are being developed in the means of instruction, the educational enterprise today stands at the threshold of a golden age of opportunity -- the chance to reach the goal once described by Dr. C. Walter Stone as "more and better learning for more people in less time through improved uses of newer media for the benefit of our free society."

We have the tools now to begin to reach that goal. Some are in the form of techniques, such as team teaching, programed instruction, educational television, audio-lingual teaching of languages, the discovery method in science and mathematics, and the systems approach to learning. Some are new kinds of materials, such as motion pictures, filmstrips, tape and disc recordings, slides and transparencies. Our technologists, our psychologists and methodologists, and our media specialists have all done their jobs well. But in our great rush for progress in applying the fruits of twentieth-century technology to education, we have not paid enough attention to one important element. That element is people -- people who must come to know and understand and appreciate what these newer media are and what they can do, and the reasons why these media should be incorporated into our educational system on a large scale.

An effective utilization of educational media requires a systematic and sustained information program for the benefit of teachers, school administrators, and the lay public. We need such a program not only to

tell our story to the uninitiated and the uninformed but also to counter the organized opposition to uses of newer media in education. The program should be under the supervision of a permanent planning and administering organization that is closely associated with existing organizations concerned with the educational utilization of media.

Guidelines for an Administering Agency

A. Evaluate and select information carefully.

All information should be selected with advice from such sources as educational organizations, educational publicists, professionally recognized research groups, and interested industrial and civic groups. All information should be verifiable by reference to sound experimentation.

B. Organize information so that it is appropriate to the audience.

The diversity of audiences must be considered. Message presentation suitable for one group will not necessarily be suitable to other groups. Hence, the audiences must be identified and classified. Further, since audiences vary in their ability or willingness to influence education, general priorities must be established. The suggested audiences, their classification, and order of priority are as follows:

1. Educational Administrators

   a. Superintendents of School Districts and of State Departments of Education

   b. Principals of Elementary and Secondary Schools

   c. Supervisors of Consolidated and County School Systems

   d. College and University Presidents, Chancellors, and Deans

e. Teacher-Training Supervisors and Deans

2. Members of Boards of Education of School Districts, Municipalities and States

3. Professional Staff Personnel of Schools and Colleges

a. Curriculum Directors and Coordinators

b. Department Chairmen

c. Teachers

4. Education Writers

a. Staff Writers for National Magazines and Large Metropolitan Daily Newspapers

b. Feature and Free-Lance Writers

5. General Adult Audiences

a. Parent-Teacher Groups

b. Citizens Advisory Committees on Education - Local and State Levels

c. Service Clubs

d. Civic Associations

e. Public-Forum Discussion Groups

C. Use a variety of media for communication.

Brochures, pamphlets, publicity releases, magazine articles, and books are recognized instruments of information dissemination. However, other media should also be utilized, depending on the nature of the message and the audience. Radio, television, motion pictures, cartoons, posters,

filmstrips, and recordings should be considered and used when appropriate.

D. Take advantage of all effective channels for dissemination.

Many educational and professional organizations, at Federal, State, and local levels publish journals or newsletters in which articles on educational media would reach wide and worthwhile audiences. In addition, many of these organizations will permit use of their membership lists for mailings of information which might be of interest to their members.

E. Coordinate informational activities with established programs.

Regularly scheduled conferences and conventions of teachers, administrators, and other professional people from the ranks of education offer good opportunity to put on presentations about educational media. Similar opportunities for disseminating information of this nature can be set up in connection with specially recognized periods or occasions, such as National Library Week, National Education Week, Teacher-Recognition Days, Back-to-School Parents' Night, etc.

F. Create and conduct new programs.

Successful promotion, whether it deals with products or observations, must maintain some degree of novelty in its campaign and its approach. Some novel steps which an administering agency should consider would include:

1. Starting a regular newsletter. Such a communication should probably be inclusive rather than atomistic in its approach.

2. Establishing media demonstration schools. These facilities might be equipped by organizations such as those which belong to the

Educational Media Council. The demonstration schools might be conducted with the cooperation of the USOE, State Departments of Education, and selected local school systems. They should be permanently located in a few key cities and should provide the opportunity for teachers and administrators to see, hear, and experiment with new educational media and associated materials and equipment.

3. Organizing and sponsoring information workshops. When selecting teachers and administrators to conduct these workshops, the administering agency should consider only those with rich experience and demonstrated ability in the use of various media for teaching different subjects at all levels. These workshops should be set up at many central locations throughout the country, so that large numbers of teachers and school administrators could conveniently attend them.

Conclusion

Effective utilization of new educational media is one of the opportunities available to our educational enterprise as a result of the technological revolution of the twentieth century. Past and present efforts to promote the introduction of such concepts as team teaching, cross-media, audio-visual instruction, programed instruction, and instructional television have achieved some successes. They have not, however, adequately developed a climate of opinion which can be depended upon to continue the active encouragement of innovation in the field of education.

Thus, a sustained national program of information dissemination about the newer educational media is urgently needed. The program should be conducted by an administering agency that is closely associated with existing organizations concerned with the educational utilization of media.

The Educational Media Council is in a unique position to execute the desired functions of the administering agency needed for this program. For carrying out such responsibilities, the EMC can draw upon a wide reservoir of professional and educational resources, representing as it does fourteen national organizations which have a primary concern for the effective use of media in education.

Guidelines for Development of Adequate Bibliographic Control of Educational Media

The flood of books, films, filmstrips, and other records has threatened to inundate the user. The frequent expressions in the literature of every field of knowledge bear witness to the continuing need for national control of bibliographic information lest we be lost in the ever-enlarging mass of recorded knowledge. The solution of this problem is crucial.

Definition of Bibliography

The word "bibliography" is defined by Murray to include "the systematic description and history of books, their authorship, printing, publication, editions, etc."[1] Shores defines a bibliography as "a list of written, printed or otherwise produced records of civilization."[2] (The latter definition enlarges the universe of recorded knowledge so that it includes serials, pictures, maps, films, recordings, tapes, objects, and any other material of communication.

History of Bibliographic Control

National bibliographic control of recorded knowledge has a long history of concern by scholars, bibliographers, and librarians, as identified in Linder's Current National Bibliography.[3] In recent years the explosion of knowledge and the multiplication of methods of recording knowledge have complicated the systematic organization and control of these reservoirs of

information. More recently, the ultimate aim of bibliography has been to provide a complete listing of recorded knowledge on a national basis and, by cumulation, for the whole world.* UNESCO has studied the problem of bibliographic control of knowledge for some time, and especially at the conference on the improvement of bibliographic services, Paris, November 5-13, 1950. Progress reports since that time have shown that UNESCO has been only partially successful in its efforts to control the vast accumulation of knowledge.

Educational Needs for Bibliographic Control

The great problem facing the user of educational materials today is to find out what materials are available, from where they are available, how much they cost, and for what purposes they may be used. The objective of bibliographic control of educational materials is to make certain that the appropriate materials reach the person or persons who plan to use them and that this information is as accurate as possible and is published promptly, so as to expedite the use of the materials.

It is the considered opinion of educational leaders that there is current urgent need for bibliographic control of educational materials namely, films filmstrips binocugens video-tapes flat pictures in color slides and other transparencies in color phonodiscs and phonotapes cross-media package kits and systems step-increment-program materials models, mock-ups charts, graphs, maps, in sets or series and that improvement in bibliographic control can be made of book and/or printed materials for educational use.

Goals Defined

Bibliographies are sometimes limited on the basis of selection -- by place of publication, by authorship, by subject, or by value or on the basis of description -- whether annotated, evaluative, or biographical. A national bibliography will of necessity be primarily enumerative and, to a lesser degree, descriptive. Special bibliographies also develop out of national bibliographies may be selective by quality of annotation, or they may be limited by type or subject or form or other factors.

There is a need for a complete listing in one or more parts on a national basis, and eventually on a universal basis -- of both current and retrospective records of all educational materials, both book and nonbook, published in a nation, without distinction as to depth of subject treated, regard for quality, or limitation by type or form of material.

There is need to concentrate on listing the "newer" nonprint materials, since books, pamphlets, magazines, newspapers, theses and other printed materials are partially controlled in various current bibliographies.

There is need for the listing to contain the following bibliographic data:

1. Sufficient information to enable the user to identify the item described. The bibliographic form should be as simple as possible and should be accurate and free from typographical or other errors.

   The following are basic elements: author, composer, or producer of the work; title; imprint, consisting of place, publisher or producer, and date; collation, which may include pagination, volumes,

illustration, also if applicable, source of supply and prices and other items.

2. Information about special equipment or machines needed to use the material.

3. Source address list of publishers, producers, and distributors.

There is a need for the complete listing to be available, in whole and in parts, on cards, in book or serial form, on film, or in any other medium which will serve the purpose.

There is need for the complete listing and its parts to be produced economically in order that wide distribution can be achieved at a minimum cost.

The development of the techniques of bibliographic control demands the sophistication of a specialist, and it is recommended that they be developed with the assistance of an expert in bibliography, such as:

Dr. Jesse H. Shera, Western Reserve University
Dr. C. Sumner Spaulding, Library of Congress
Dr. Louis Shores, Florida State University
Dr. Maurice Tauber, Columbia University
Miss Esther Piercy, Enoch Pratt Free Public Library, Baltimore

REFERENCES

1. Murray, James A.H. A New English Dictionary on Historical Principles. Oxford: Clarendon Press, 1888-1933.
2. Shores, Louis. Basic Reference Sources. Chicago: ALA, 1954. p. 11-12.
3. Linder, L.H. The Role of Current Cumulative National Bibliography. New York: Scarecrow Press, 1953.
4. Harlow, Neal. "Documentation and the Librarian." Library Journal, LXXXI (May 1, 1956) p. 1085.

Guidelines for Development of Recommended Technical Specifications for Educational Media

Definition of Terms

For classification purposes, there is set forth herein a definition of some of the terms used in this guideline.

"Materials" are the physical units which store or record the information used for instruction in any subject area namely, books, maps, charts, slides, films, phonorecords or tapes, filmstrips, videotapes, programs for teaching, etc. The variety of materials is constantly changing as items like electronic recordings, transparent films, etc., are added to the technology of recording.

"Equipment," on the other hand, covers the holding, recording, reproducing, transmitting and displaying of devices that are employed to utilize the "materials" namely, film projectors, TV receivers, phonographs or tape recorders, and of course, the camera and recording devices, etc.

"Media" therefore may be considered a system or method, personnel, or materials and equipment necessary for accomplishing a particular instructional technique.

"Standards" may cover merely values (or ranges of values) sought to be obtainable for good functional results. Standards may apply to sizes of type, level of sound, degree of brightness, level of language in which subject matter is written, type of protection for materials or equipment for particular environments, etc.

"Specifications," on the other hand, reflect a selection or decision from among a range of values allowed by standards for a particular application, with each specificity that a common understanding will result and an acceptable product or service can be furnished. Specifications, therefore, are expected to become part of a purchase agreement, or contract, and enable valid and sound business transactions to be executed. If the specifications are purposely written to provide only for a desired economic performance or requirements specification, and thereby allow variety of designs to be considered and accepted, this may result in a multiplication of maintenance and replacement problems. The degree of definitiveness in the specifications will be based on the technical capability of the producing party, when prepared by it. On the other hand, producers or groups of them may prepare specifications to cover the particular products they are able to offer, and each specification reflects skillfulness to be found in the stated characteristics and performance. In order to ensure a multiplicity of sources, specifications should be proved so as to be acceptable to a sufficiently wide range of producers.

Need for Standards and Specifications

The scientific and technical advances, which are currently contributing at a significant pace, have produced a wide variety of alternative materials, techniques, devices, and structural or organizational arrangements, which may have application to the educational process. There has also been developed in management science, a decision-making process in which a comprehensive analysis of the possible alternatives is made, and a formula employed for arriving at optimum solutions for various sets of circumstances.

Such study, experimentation, and trial need to be accomplished to furnish the factors to be used in the formulas for this decisionmaking process in the field of education; and this is now going on, and needs to be encouraged. The EMC is urging many of the necessary steps to be taken, and is offering the appropriate capabilities and experience as a guide.

"Standards" are ordinarily set as expressions of desired accomplishment or performance in order to avoid confusion and waste and to permit economical production of the desired equipment and materials. Standardization is the responsibility of a professional or technical organization in the field involved whose recommendations can be expected to be guiding. On the other hand, "requirements" are the expression of need by a potential user. Such requirements may be specific to a particular function, service, or equipment; the requirements will generally continue to be accepted whether or not when recognized as adequate, or may knowingly exceed a standard when one exists are being explored.

In this climate of constant change and development, a great deal of the newer material and equipment which is being acquired for use in the ongoing educational effort has not attained as a "stabilized" condition which would permit establishment of specifications for adoption and procurement. Yet, this kind of action should be foreseen, planned, and executed as early as the state of development will permit in each segment of the total media field. To enable the specifications development effort to proceed as soon as possible, the development of standards should be undertaken at once. It would appear that standards could be established in certain fields at this time; these might include ETV classroom receivers, language laboratories, film projectors, slide projectors, etc.

Area particularly, the responsibility for adopting standards and state implementing specifications should be established. The existing national organizations which have active or potential technical jurisdiction should be asked to develop programs to cover each area of interest in the educational activities. In general, the American Standards Association is the recognized national professional and industrial coordinating body, and it should be asked to advise on the course to be adopted to ensure the necessary action. Presumably, a series of task forces covering specific areas would be established by ASA, on which EMC and involved bodies and specialists would participate. This is particularly important, since international standardization (which seems critical in educational materials and equipment) is fundamentally accomplished through the ASA.

At the present stage of development of materials and equipment, certainly, many areas, such as films, discs, tapes, and even textbooks, have attained such a high degree of acceptance that standards and specifications are probably appropriate. If they are not already in existence, they should be established and listed for the guidance of the responsible educational authorities.

Conclusions and Recommendations

In view of the fact that the individual States and their subordinate educational organizations have the ultimate authority to decide on materials and equipment to be adopted and acquired, any listing of recommendations in this area can only be advisory. In order for such advisory information to have the necessary degree of acceptance and usefulness, the State educational authorities might be requested to concur in the value of having a potential

National Index of Recommended Standards and Specifications for Educational Material and Equipment created, and to agree on the criteria of "standards action" approval or recommendation which would warrant inclusion of appropriate items in such an index.

It seems that a service of this character, to be offered to the State educational bodies, might most economically and effectively be rendered through the U.S. Office of Education; and a program toward this end should be planned and prosecuted. Both the establishment of a standardization program (to be accomplished through ASA) and the publication of the National Index of Recommended Standards and Specifications for Educational Materials and Equipment (a logical companion publication effort to the Educational Media Index) could logically be executed by the Educational Media Council on behalf of ASA and other supporting bodies.